

Customizing Static Analysis for C and C++

Coverity Extend is an easy-to-use Software Development Kit (SDK) that allows you to detect unique defect types in C and C++ code by creating custom checkers. In addition to the SDK, Coverity Extend comes with all the out-of-the-box checkers provided by Coverity Prevent and leverages Coverity analysis techniques.

To use Coverity Extend, you simply utilize the powerful SDK to write checkers. Next, you analyze the code using the new checkers to pinpoint the developer-defined defects. All the discovered defects are consolidated in the Coverity Prevent Defect Manager alongside standard defects. All of the extensions built by developers are stored in a Custom Checker Library so you can build, execute and store an unlimited number of checkers.

In addition to creating custom checks for finding concurrency, exception handling, and other critical issues, Coverity Extend can also help you achieve compliance with corporate or industry standards. It allows you to add targeted stylistic rules that check only those conventions that are important to your organization without adding another different, separate product to the development process that will enforce stylistic constraints.

Benefits

- Find defect types specific to your code base
- Model the rules you need to enforce
- Reduce compliance costs by adhering to coding standards
- Reduce the labor overhead of manual code inspections
- Address custom development conventions

How Does it Work?

Writing Coverity Extend checks only requires C and C++ programming skills. Once you compose an extension, it integrates directly into the Coverity analysis engine which executes the checks across your entire code base.

Customized Static Analysis in 3 Steps:

1. Define a rule

Begin creating a check by defining a sequence of source code actions along a path that could trigger a defect. Coverity Extend includes a simple library of macros and templates for performing highly complex analysis functions.

2. Specify pattern matches

Specify a pattern match against the line and artifact in the source code. At the simplest level, matches can be textually based, such as a function name. However, nearly any type of pattern can be expressed as an Extend rule, so very complex defects can also be captured.

3. Integrate into GUI

Coverity Extend provides a standard set of customizable routines for creating error messages and enabling GUI integration.

Use Coverity Extend to:

- Find custom or domain specific defects unique to your code
- Comply with company or industry standards such as MISRA
- Automate parts of the manual code review

Sample Checks:

- Disable interrupts locally rather than globally
- Enforce custom security policies
- Use memory mapped I/O rather than copying
- Enforce naming conventions
- * Get all properties of parent classes
- * Enforce that arrays for callers be null-terminated
- * Use of global variables
- * Find all arguments that are passed by reference
- * Report assignments to the iteration variable inside a while loop

Deployment Options

You can leverage Coverity Extend in two ways:

1. Do-it-yourself—Developers can opt to write checkers themselves.
2. Coverity Professional Services—Coverity's engineers can create custom checkers for you.

On-site Services

Some organizations may want to enlist the help of Coverity consultants to optimize Extend checker development. These services typically consist of:

- * Best practices design and development of Extend checker
- * Implementation, testing and refinement within your environment

Typical length of engagement:

- * 1-4 days: simple pattern-based checkers
- * 5-10 days: complex path-sensitive checkers

Contact a sales representative for more information.

Example: Using path analysis to detect performance degradation caused by a blocking call

```
#include "extend-lang.h"
enum fun_state_t {
    UNLOCKED = 0,
    LOCKED = 1
};
START_EXTEND_CHECKER( block_check, int_store );
ANALYZE_TREE()
{
    Fun locking_fun("lock");
    Fun unlocking_fun("unlock");
    Fun blocking_fun("fopen");
    if ( MATCH(locking_fun) ) {
        SET_STATE(LOCKED);
    } else if ( MATCH(unlocking_fun) ) {
        SET_STATE(UNLOCKED);
    } else if ( MATCH(blocking_fun) ) {
        if ( GET_STATE() == LOCKED ) {
            COMMIT_ERROR("Called fopen within a locking context.");
        }
    }
}
END_EXTEND_CHECKER();
MAKE_MAIN( block_check )
```

Supported Platforms	Supported Compilers	Supported IDEs	System Requirements
<ul style="list-style-type: none">LinuxFreeBSDWindowsSolaris SparcSolaris X86HPUX-PANet BSDLinux Itanium	<ul style="list-style-type: none">gcc, g++MS Visual C++Sun C/C++ARMWind RiverTI Code ComposerGreen HillsFreescala/Nokia CodeWarriorIARHI-TECH PICCIntel C/C++HPUX aCCMarvell MSASupport for other ANSI C/C++ compatible compilers available upon request	<ul style="list-style-type: none">Eclipse 3.2 and laterEclipse-based IDEs including:<ul style="list-style-type: none">ARMIBM RationalMentor GraphicsNokiaQNXTelelogicWind River	<ul style="list-style-type: none">1 GHz CPU1 GB of RAM minimum, 2 GB recommended1 GB of free hard disk space

Free Trial

Request a free Coverity trial and see first hand how to rapidly detect and remediate serious defects and vulnerabilities. No changes to your code are necessary. There are no limitations on code size, and you will receive a complimentary report detailing actionable analysis results. Register for the on-site evaluation at www.coverity.com or call us at (800) 873-8193.

About Coverity

Coverity (www.coverity.com), the leader in improving software quality and security, is a privately held company headquartered in San Francisco. Coverity's ground breaking technology enables developers to control complexity in the development process by automatically finding and helping to repair critical software defects and security vulnerabilities throughout the application life cycle. Hundreds of companies worldwide including ARM, Phillips, RIM, Rockwell-Collins, Samsung, and UBS rely on Coverity to help them ensure the delivery of superior software.

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